DOCUMENT RESUME

ED 346 948 PS 018 314

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TITLE Affordances in Preschool Lesson Structures and Socially Competent Task-Related Behaviors: A Gibsonian Ecological Re-Interpretation.
PUB DATE Jul 89
NOTE 27p.; Paper presented at the International Conference on Event Perception and Action (5th, Oxford, OH, July 24-28, 1989).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Classification; Classroom Research; *Data Analysis; *Data Interpretation; *Ecology; *Preschool Education; Student Behavior
IDENTIFIERS *Affordance (Environment); *Signal Systems (Kounin and Gump); Theoretical Analysis

ABSTRACT

The primary thesis of this paper is that James J. Gibson and Kurt Lewin and their followers subscribe to the central ecological notions of interdependence of organisms and their environments. An attempt is made to show the connections between Gibson's conceptualization of affordance, and the related Lewinian notion of psychological ecology. Presentation of Gibson's concept is followed by discussion of relevant concepts related to Lewin and his later students, Roger Barker, Jacob Kounin, and Urie Bronfenbrenner. Next, Kounin's last research project is analyzed. The project concerned nursery school environments as ecological behavior settings that promote or hinder socially competent behaviors of children. All 596 lesson settings described in Kounin's project are generically classified into six signal system categories based on dichotomous concepts of continuity/lagging and intrusiveness/insulation: (1) signals from effects of one's own behavior on continuously present materials; (2) sequenced signals from a single, continuously emiting source; (3) teacher pacing of signals to children and use of continuous external signal source; (4) recitation with discrete, multiple child signals; (5) multiple and shifting signals, primarily from child sources; and (6) signals from a central source and inputs from high intensity props or actions. Results are discussed. Over 30 references are cited. (RH)

Title: Affordances in preschool lesson structures and socially competent task-related behaviors: A Gibsonian ecological re-interpretation. A paper presentation to the Fifth International Conference on Event Perception and Action, Miami University, Oxford, Ohio, July 24-28, 1989.

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ABSTRACT. During the late 1960's and throughout the 1970's several oral presentations and paper publications were the result of a research grant (MH-15472) from the National Institute of Mental Health, Jacob S. Kounin, Senior Researcher. The project consisted of a naturalistic and exploratory ecological analysis, over a two-year period of time, of 87 preschoolers' (between 29 and 60 months of age) and 36 student teachers' video taped behaviors. Task-related behaviors of both the children and the teachers were examined in 596 different lessons, each teacher directing approximately 18 lessons. In addition, 37 children's behaviors, one at a time, were video-taped throughout a typical 3-hour nursery school day where their undirected free-play time was monitored. A comprehensive summary of several analyses which were derived from this project is contained in Kounin & Sherman (1979). At the time these data were analyzed the researchers associated with this project were not aware of James J. Gibson's (1979; Gibson, 1983; Reed, 1988; Reed & Jones, 1982) theories concerning "affordances." For the most part, the results of these studies were explained from an "ecological" perspective based on the earlier work of Jacob S. Kounin, Paul Gump and Roger Barker (1968), all originally influenceed by Kurt Lewin/(Kounin and Barker were students of Lewin during the late 1930's). An ecological model assumes interaction between organisms and their environment. The concept of "behavior setting," sometimes attributed to Roger Barker, was used to explain these data/(See Kounin & Sherman, 1979). Early in the 1980's the present researchers became aware of Gibson's theories concerning "affordances" and began to re-examine how this concept provided an alternative explanation for the earlier studies. /The present paper suggests that these earlier studies (Kounin & Gump, 1974; Sherman, 1975; Kounin & Sherman, 1979) may be explained using Gibson's concept of affordances, especially as this concept relates to socially competent interactions (Oppenheimer, 1989) in preschool educational environments. All lesson settings were generically classified into six signal system categories. Each is shown to afford more or less task-related behaviors. Appropriate and inappropriate standing behavior patterns of the children are used as a dependent variable predicted by the signal system categories of the lessons irrespective of the teachers. It is believed that these empirical data, explained from a Gibsonian point of view, might support an extension of the affordance concept to the domain of socially competent interaction. Also included is a discussion of the some historical relationships between Gibsonian Affordance theory and the dynamic psychological theories of Kurt Lewin and his later students./

INTRODUCTION

It is not uncommon for different scholars to arrive at similar conclusions independant of each other. This is sometimes especially true of scholars who are contemporaries of each other. It is suggested that two reasons for this lack of awareness might be 1) the slow pace at which research is published, and 2) the vast differences between problems and issues upon which each researcher focuses. This is one of the primary theses of this paper. James Gibson's early concern for problems of perception probably may not have directed him toward group dynamics issues which were of primary concern to Kurt Lewin during the 1940's. While Gibson's early research was contemporary with Kurt Lewin's, and certainly he was aware of Lewin's earlier thoughts regarding "life-space" or "dynamic psychology," he does not seem particularly aware of Lewin's two principal students during the late 1930's and early 1940's, Roger Barker and Jacob S. Kounin, both of whom were strongly influenced by Lewin as well as quite influential to each other and continued to advance Lewin's notion of psychology ecology. Bronfenbrenner (1977; 1979) is another example of a scholar strongly influenced by Lewin's concept, psychological ecology. The notion of "interdependence" is central to any definition of ecology, the science of studying the interactions of organisms and their environments. One cannot come to a complete understanding of the nature of social actions without also considering the contexts (life-space) within which they happen.

It is the primary thesis of this paper that both Gibson and Lewin and the various followers of each subscribe to the central ecological notions of interdependence of organisims and their environments. We believe it might be better to view these different approaches as complimenting rather than opposing each other. Therefore, an early attempt will be made to show the connections between Gibson's conceptualization of "Affordance," and the related Lewinian notion of "psychological ecology." Gibson's concept will be presented, followed by some relevant concepts related to Lewin and his later students, Roger Barker and Jacob Kounin, as well as Urie Bronfenbrenner. This will be followed by a description and re-analysis of Kounin's last research project which examined nursery school environments as ecological behavior settings which either promote or hinder socially competitent behviors of children.

THE THEORISTS.

Gibson and Affordances. Eleanor J. Gibson, wife of the late James Gibson, has described her husbands concept of "affordance" within the context of a "Renascence of Functionalism" (Gibson, 1983, p. 55; also, see Gibson, 1988), stating that "It is a matter of common agreement among scientists that not many ideas are new." She goes on to define affordance (Gibson, 1979):

> The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb

> to afford is found in the dictionary, but the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment. (p. 127)
>
> An important fact about the affordances of the environment is that they are in a sense objective, real, and physical, unlike values and meanings, which are often supposed to be subjective, phenomenal, and mental. But, actually, an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjec ive-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer. (p. 129)

Additional definitions and discussions are also included in Reed & Jones, 1982:

> Not only objects but also substances, places, events, other animals, and artifacts have affordances. I assume that affordances are not simply phenomenal qualities of subjective experience (tertiary qualities, dynamic and physiognomic properties, etc.). I also assume that they are not simply the physical properties of things as now conceived by physical science. Instead, they are ecological, in the sense that they are properties of the environment relative to an animal. These assumptions are novel, and need to be discussed. (p. 404).
>
> The meaning or value of a thing consists of what it affords. Note the implications of this proposed definition. What a thing affords a particular observer (or species of observer) points to the organism, the subject. The shape and size and composition and regidity of a thing, however, point to its physical existence, the object. But these determine what it affords the observer. The affordance points both ways. What a thing is and what it means are not separate, the former being physical and the latter mental, as we are accustomed to believe.
>
> The behavior of the animal has to be controled by the affordance (for him) of the substance, object, or place. And this affordance has to be perceived by the animal if his behavior is to be controled. True, the affordances of substances and surfaces differ for different animals. The ant, the bird, and the primate live in different "niches" as the ecologist puts it, but the reciprocity of the animal and its environment is the same for all. (Reed & Jones, 1982, p. 408)

It should be emphasized that behavior (animal or human) and perception are both involved in the above definitions. Behaviors are in accordance with the affordances of the environment and this depends on the perceptions

of these environments. As psychologists, we must be concerned with what one can do as well as with what one perceives. Proper action implies perception of the affordances offered by an environment. Eleanor Gibson (1983, p. 57) goes on to describe the importance of this concept (Affordance) for developmental psychologists stating:

> I need to find out what the environment offers in the way of affordances -- how to describe them, what the appropriate behaviors are -- and also whether and where they are perceived as affordances. As there are appropriate behaviors, I ask in my experiements on perception whether different affordances are differentiated by appropriate behaviors. To what extent must young creatures (human or otherwise) learn to perceive them? And if they must learn, how is it done? ...affordances are not invented or read into events by the perceiver. They are there to be perceived. (Gibson, 1983, p. 57)

> Affordances, we suggest, are at least partially learned. The learning is primarily perceptual - differentiation of informative arrays, both modality-wise and within structure of a given array - and detection of supramodal information over modalities. In addition there is learning through observation of the consequences of one's exploratory activity. Maturation of other subsystgems (e.g., action systems), as suggested in a systems analysis, is another factor in development of perception of affordances. (Gibson & Schmuckler, 1989, p. 23)

In detailing the historical context of Affordance Theory, James Gibson acknowledges earlier theorists and related concepts including Lewin's term, "Valance" (Aufforderungscharakter), and Koffka's (1935) concept of "demand-character." His major sources for these concepts (valence, demand-character) are somewhat ancient and do not acknowledge later developments within these theoretical schools: eg., in refering to demand-character, he referes to Koffka's Principles of Gestalt Psychology (1935), and when discussing Lewin's term, "valance," he refers to Adams (1931) and Brown (1929). The only relatively modern reference to Lewin is Marrow's (1969) biography. Because of this lack of reference to more contemporary extensions of especially Lewinian dynamic theory, Gibson's (in Reed & Jones, 1982, p. 409) discussion of differences between affordance theory and Lewin's "life-space" theory may be somewhat wrongheaded. Gibson does acknowledge some confusion with regard to the meaning of these two terms, valance and demand-character, but suggests that the earlier Gestalt theorists (he would include Lewin here) were not clear about resolving the "...subjective-objective dichotomy. They sometimes talked as if a valence were a fact of the environment but at other times as if it were only a fact of experience." (Reed & Jones, 1982, p. 410). Gibson goes on to state: "Now, forty years later, we should know better, for the environment is no longer quite so physical and experience is no longer quite so mental as it was then." (p. 410). We would definitely agree with this last statement. The earlier ambiguity which Gibson points out, we believe, has been somewhat resolved in the work of Lewin's later students, Jacob Kounin and Roger Barker, as well as Bronfenbrenner.

Lewin And The Psychological Ecologists. The principal Lewinian concepts which Gibson addresses are "Valence, Need and Satiation". For Lewin the primary notion of life-space psychology was that it was dynamic and consisted of both a person and an environment. The famous equation, BH = f(P+E), indicates the ecological orientiation of his theory. The main constructs associated with this theory are diveded into two parts, person (P) centered contructs and those associated with the environment (E), and one cannot completely understand behaviors (BH) with out understanding persons and their environments (See Figure 1). Existing within the person are two additional interdependent constructs, needs and abilities. The concept of a tension system, or "force" (motivation), which arrouses a "need" to obtain a goal (action which is taken upon the environment and determines the "vector" or direction) may be limited by the "abilities" of the person to "differentiate" the life space as well as negotiate (locomote) through the "environment." Outside the person in the "environment" are goals towards which or away from which one moves (locomotes). These goals are described as being either attractive, positive (+), or repulsive, negative (-), with regard to "valence". Environments alsc consist of "paths" through which one must traverse, encountering "barriers" and "detours" along the way to obtaining "goals" which are made more or less salient by the needs of the person, as well as the proximity of the person to the goal. A goal which has been fulfilled (consumed) is said to be "satiated," and ceases to be a salient feature of the environment for the person. Lewin's earlier studies of frustration examined the behaviors of nursery school children when they could not obtain postively valent goals (frustration). Kounin's early studies examined co-satiation of differentiated regions of the life-spaces of younger and older mentally retarded subjects.

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As research proceeded throughout the 1940's Lewin increasingly became interested in what became known as "Group Dynamics," examining the the effects of leadership style and group climate on human social interactions in the classic "democratic, autocratic, laize-faire" studies. (It might be pointed out here that these studies were carried out in school-like classroom environments, not unlike what we will describe later. This is also true of the nursery school frustration studies mentioned above. In this sense, Lewin and his followers had a continuing interest in human behavior and social interactions in educational and institutional environments.) By the time of his passing in 1947, he had influenced many students in a variety of ways. One of his last concepts to evolve in these later years was the term "psychological ecology" and his two students, Roger Barker and Jacob S. Kounin, spent the rest of their professional lives attending to this concept.

Roger Barker. With his colleague, Herbert Wright, Roger Barker in the early 1950's established the Midwest Field Station (Oskalousa, Kansas), a small town near Lawrence, Kansas and the University of Kansas, where both

Barker and Wright held academic positions in the Psychology Department. Their research contributed a variety of concepts, theories and naturalistic research strategies, including the idea of surveying the "behavioral episodes" which people participate in throughout their ongoing daily lives. These studies have been described in his books, **The Stream of Behavior and Ecological Psychology,** as well as, **Big School Small School**, co-authored with Paul Gump. The concept of a "Behavioral Setting" evolved throughout this period of time. A behavior setting consists of a milieu (a physical place, at a specific time, in which an activity takes place) requiring specific standing behavior patterns of the people who populate it. Barker (1968) has provided the generic name of "synomorphs" for such ecological units. This concept of Barker's (behavior settings) produced a rich agenda of research for himself and those who he influenced, including Paul Gump, Phil Schoggens, as well as Jocob S. Kounin. Children's as well as Adults' "life-spaces," both in the home and community at large, as well as institutional school settings were the environments in which behavior settings and their associated standing behavior patterns were examined.

Following the original Lewinian concern for a "dynamic" theory, Barker and his associates focused their research on each part of the original formula, BH=f(P+E). Dependent variables associated with standing behavior patterns (BH) were related to the environments (E) in which persons (P) were examined. The abilities and needs of the person were shown to be interdependent with the environments which they inhabited. They developed a rich lexicon of terminology to describe these three elements. One of those terms, an "environmental force unit," or EFU was studied by Schoggens (in Barker's (1963) **Stream of Behavior**) appears quite similar to the term "demand character" mentioned by James Gibson, in his discussion of Kaffka's theories (in Reed & Jones, 1982, p. 409). In **Big School Small School**, the effects of under- and over-populated behavior settings are shown to affect who participates, as well as the level of participation of those how inhabit the settings. They were also concerned with generically classifying the variety and number of behavior settings which are available to and which people encounter throughout their daily lives: eg., Paul Gump (1968) demonstrated the variety of behavior settings available within the same third-grade classroom. This is admittedly only a superficial recounting of Barker's influence. However, in all instances it should be emphasized, Barker and associates assumed an interdependence between the person and the environment, an ecological perspective. The vast majority of these studies demonstrate the reliable regularities (Gibson might say "invariances") of human behavior within and between different environments. As will be suggested later, Gibson's notion of "affordance" may provide a similar but less specific explanation for these predictable regularities.

Jacob Kounin and Paul Gump. Throughout nearly 40 years, Kounin maintained contact with his fellow classmate, Roger Barker. As was stated earlier, both were graduate students of Kurt Lewin in Iowa where they received their PhD's. While Barker went to Kansas, Kounin eventually took a position in Detroit at Wayne State University's Department of Educational Psychology, in a College of Education. His research agenda was focused upon issues of classroom management and discipline and he is probably best known for his pioneering research with video-taped classroom interactions.

He describes his research as "Exploratory Ecological Research," and positively stresses the "ex-post-facto" and naturalistic approach to examining social interactions in naturally occuring school settings. Most of this work is sumerized in his classic book, Discipline and Group Management in Classrooms (Kounin, 1970), which is refered to in nearly every educational psychological text book printed after 1970.

Paul Gump was one of the primary consultants and collaborators on many of Kounin's exploratory ecological studies, as well as the last series of Nursery School studies begun in the late 1960's (eg., Ambinder, 1973; Kounin & Gump, 1974; Kounin & Sherman, 1979). Gump's continuing association with Barker provides a direct link between Kounin and Barker. These studies of nursery school environments will be discussed in more detail later and related to Gibson's Affordance concept. However, at this point it might be important to point out that these studies used a particularly exploratory ecological strategy. The primary dependent variables in these studies were categorical levels of children's behaviors. First, nearly 596 lessons were reliably categorized into six generic types of lesson structures. Then, children's standing behavior patterns which were synomorphous (that is, appropriate, congruent with and supporting of the activities that teachers presented to the children) were determined. Inappropriate behaviors and deviant behaviors, those which were not synomorphous, were also reliably categorized. This was done every six seconds for all children inhabiting all lesson behavior settings. The children were categoriezed as being "appropriately involved, partially involved, not involved (dormant), inappropriatly involved or deviant". (See Kounin & Gump, 1974, for further details of these codes.) The children's behaviors could then be aggregated to represent proportions of involvement (or the lack thereof) in any particular lesson - an individual lesson eventually became the primary unit of analysis (n = 596). Thus, one could investigate proportions of specific behaviors associated with a variety of generic lesson types and determine which of the behavior settings obtained the highest or lowest levels of appropriate and inappropriate involvement. As Kounin & Gump (1974) state:

> The research asks whether certain qualities or dimensions of lessons can be delineated, whether these qualities can predict to the task-related behavior of children in these lessons, and whether these predictions can be made independently of the differences of the teachers and children who inhabit these lessons. (p. 555)

This last statement ("...independently of the differences of the teachers...") suggests a Gibsonian concern for the 'affordances which a behavior setting might provide.' If one obtains certain reliable behavioral regularities within similar settings, one might conclude that the behavior settings themselves are "affordances". The terminology of "Affordance Theory" was not available when these studies were initially reported. On the one hand, all though "Affordance Theory" is not necessary to explain these earlier studies, on the other hand their results do provide evidence for the support of Affordance Theory. This will be the primary position of this paper.

Bronfenbrenner and Oppenheimer. Before proceeding further, the additional issues of social competence and social conformism and their relationship to the ecology of human development should be introduced. Urie Bronfenbrenner is the principal scholar associated with this discussion. Bronfenbrenner acknowledges his Lewinian influence in both of his major writings concerning "human ecology" (Bronfrenbrenner, 1977 & 1979). Oppenheimer (1989) in his discussions of the nature of social action and social competence has recently stated:

> On the basis of a discussion of literature dealing with theory, models, and assessment of social competence as well as empirical research with regard to social competence, it is argued that the terminology used and the interpretation of the empirical findings do not characterize the development of children but rather the environment in which they must function socially. Hence, many of the abilities that have been assessed and that are thought to involve "social skills" merely reflect children's abilities to conform to the demands and expectations of the social environment. Consequently, the development of socially desirable behavior has been studied, not the development of competence. To understand the latter development, a dynamic interactional model of development (i.e., an activity-levels model of development) should be attended to. The interaction between the needs of the organism, the perceived expectations and demands made upon the developing child by the social environment should be addressed. (p. 2)

This last concern is remarkably Lewinian. Oppenheimer continues his discussion drawing on Bronfenbrenner's (1977, 1979) ecological concepts of micro-, meso-, exo- and macro-systems, of which the micro- and meso-sytems are of greatest importance to this paper. The macro-system consists of the culture or subculture of belief systems or ideologies and encompasses the exo- and meso-systems. The exo-system represents those settings "..that do not involve the person as an active participant, but in which events occur that affect, or are affected by, what happens in the settings containing the person..." (Bronfenbrenner, 1977, p. 25). The meso-system is described as the different social contexts in which a child actively participates (eg., an immediate nursery school lesson). The meso-system would also include the family, peers, and school systems. The micro-system might be described as follows:

> The link between the organism and the environment is the micro-system ... the child him/herself (ie., the phenotype). The child is the final system representing the interaction or dialectics between the major systems (i.e., the organism and the environment) and refers to the product of this dialectic. It is characterized by developoment of normative age-graded influences as the result of changing interaction patterns and changes in the nature of the dialectic over time (i.e., maturation and history-graded influences. (Oppenheimer, 1989, p. 19)

While the present paper is not directly concerned with the "development" of social competence, it is concerned with the transactions of organisms with their environments; ie., the micro- and especially the meso-system. If one could interprete standing behavior patterns which are "synomorphous" with their behavior settings (that is approriate) as "socially competent," then the opposite might be true as well; ie., inappropriate behaviors are socially incompetent. Both appropriate and inappropriate behaviors may also be reflecting the child's ability or inability to conform to certain expectations and demands of the environment. If certain environments promote appropriate behaviors among the same children more frequently than others, then we might interpret these environments as evidence of specific affordances. Obtaining knowledge of the positive affordances of particular behavior settings might enlighten us about the environments which children inhabit.

Summary. The preceeding discussion has first presented a description of Gibson's concept of "Affordance." It was then shown that a parallel but perhaps earlier development stemming from the work of Kurt Lewin emphasized and defined the term "psychological ecology." The continuing development and advancement of Lewin's psychological ecology by his two principal students, Roger Barker and Jacob Kounin, were briefly described. The concept of a synomorph (behavior setting) was discussed, suggesting that it is a major interdependent influence upon human behavior. It was also suggested that because each theorist had their own narrow focus of interest (Gibson and perception, Lewin and group dynamics, Barker and behavior setting surveys, Kounin and classroom management), they may not have been as aware of each other's similar concerns and conclusions. If one could return to the primal Lewinian formula, BH = f(P+E), each theorist may have been more or less interested in one of the elements, but, all of them subscribe to the interdependent and dynamic nature of this formula. Gibson's concerns for perception may have focused his research more on the person (P) while eventually acknowledging the influence of the environment (E). Because of his interest in perception, nuero-physiologists and developmental psychologists might have been more interested in his earlier research (See Gibson, 1982 for further details of the developmental psychology implications). He was also more experimentally oriented, accomplishing much of his research under laboratory conditions. Barker and Kounin both seem to be more focused on environments (E) and their influence on behavior (BH), with minor interest in person-centered constructs. They were also more interested in natural everyday as well as school and classroom environments of interest to educational psychologists. Figure 2 displays a flow chart of the major persons directly influenced by Lewin's notion of "psychological ecology." Social actions of human's occupying behavior settings was introduced by describing Bronfrenbrenner's ecological concepts, which were also shown to be indirectly influenced by Lewinian theory. The idea that behavior patterns may be synomorphus with behavior settings (socially competent) or inappropriate (socially incompetent) was then discussed. Finally, it is suggested that behavior settings may be conceptualized as "affordances," which more or less support appropriate and socially competent actions of children.

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THE NURSERY SCHOOL STUDY

INTRODUCTION.

This section of the paper will be concerned with a description of Kounin's last research project. We have already briefly described some elements of this study in the above discussion of Kounin's ecological concerns. The Kounin & Gump (1974) and Sherman (1975) manuscripts report the emperical details of the samples, methodology, observational codes, analyses and major conclusions from these studies. This information is contained in Appendices A and B of this paper. Additional discussions of a more comprehensive nature are contained in Kounin & Sherman (1979) and Gump (1980). Also, Phyfe-Perkins (1980) may be of secondary interest in its interpretation of the meaningfulness of this research for nursery school education.

Throughout the history of the nursery school movement, several different objectives or goals have been suggested. One important goal has been the "socialization" of children to institutional settings. Learning how to attend to an instructor, getting along with one's peers, and other social goals are descriptions of desirable and socially competent behavioral outcomes of the nursery school experience. While specific cognitive skills are encouraged, certain basic social competencies are a desirable outcome of the nursery school experience. Admittedly, this might be a process of learning to conform to certain rules and standards of behavior. This was especially true of the nursery school where Kounin's last project took place. However, it should be pointed out that the nursery school was also operated for and by a College of Education and had one other function, the training of teachers. While it had two experienced master instructors available at all times, the primary instruction of children in the video-taped formal lessons was accomplished by pre-service student teachers. It is believed that the naivete of these student teachers was a definite asset to the study. At no time were their lessons intentionally influenced or biased by the expectations of the researchers. (See Kounin & Gump, 1974 for a further discussion of this issue.) Rather, the objective was naturalistic in that we wanted to see what normally goes on in a nursery school, without any coersion from the researchers.

Methodology

Sample.

These studies took place in a university nursery school in a metropolitan area. Over the two year period of time in which this study took place, 87 children and 36 teachers' behaviors were video-taped. Two different groups of 20 children each attended either a morning (AM) or afternoon (PM) session lasting approximately 3 hours each academic quarter (10 weeks). The two groups of children were heterogeneous with respect to age (ranging in age from 29 to 65 months), gender (one half boys and the

other girls), race (60% non-Caucasian including Indian, Oriental and Mexican children) and socioeconomic background (families ranging from $3000 to $75,000 in annual incomes). Two experienced teachers were present at all times, and six student teachers were present, three in the AM and three in the PM session each university quarter.

Settings.

The Formal Lesson. Part of the daily routine of the preschool included taking three preformed subgroups of children (a younger, middle and older group) from each AM/PM session and presenting them with a formal lesson taught by a student teacher. These lesson groups were formed by the head teacher on the basis of approximately homogeneous chronological age groupings, but they were heterogeneous with respect to gender and race. The number of children in a lesson group occasionally varied due to absences and ranged from 3 to 9; however, 87% of the 596 recorded lessons had from 4 to 8 children.

The lessons occurred in a limited and protected area of the total nursery school. The room was 2.13 x 2.74 meters and had one entrance door, one window with pull-down shade, and a one-way observation window (mirror). A group of children was scheduled for a lesson period for approximately 20 minutes a day. The lessons were chosen and planned by the student teachers. The lessons were diverse in content and format, both between teachers and for any one teacher on different days. Lessons were recorded on videotape. A stationary video camera was attached to a corner about two meters from the floor, and a microphone was hung near the one-way mirror/window. A wide-angle lens made it possible to view most of the floor space. The operator and recording equipment were in a different room behind the one-way mirror. The operator videotaped 596 lessons taught by 36 different teachers (6 teachers per academic quarter; 3 for the AM and 3 for the PM sessions). All teachers of any academic quarter taught all three groups an equal number of times and all the lessons of a teacher's first two groups were recorded. The timing and duration of lessons was obtained from the video tapes. The recording extended over a period of two years, and 87 different children were the unrehearsed participants of these lessons.

Freeplay. When the children were not in the formal lessons, they were out in the "freeplay" area of the nursery school where they could engage in a rich variety of uncoersed activities. The dimensions of this freeplay environment were 8.8 x 11.1 meters. Regular and student teachers who were available to the children in this environment but gave only minimal assistance and guidance: they rarely intruded into the children's activities unless requested. Thirty-seven (37) focal children's activities were videotaped throughout their normal nursery school day in this environment. Further descriptions of this environment and the recording techniques which were used are contained in Sherman (1976 & 1977), Rosenthal (1973) and Houseman (1972).

Variables and Their Measurement.

Possessing 596 video-taped lessons taught by 36 student teachers, one investigative problem became quantification. How could these repeatedly viewable but free-flowing events be translated into quantified variables so that relational questions could be asked and answered? Not only were there 596 lessons, but we also had video-tapes of 37 focal children whose behaviors were recorded throughout an entire nursery school day.

Dependent Variable 1: The Child Behavior Codes. Since lessons were meant to engage or involve children, it became important to determine which varieties of lessons best held the attention of the children and supported appropriate behaviors; that is, those behaviors which were synomorphous with lesson structures. A child's behavior was coded into one of three mutually exclusive categories:

> Appropriately involved. This was coded when the child was clearly engaged in the official activity and in a manner appropriate to the thrust of the lesson at that time. The involvement could be passive, for example, listening to a story, watching a demonstration; or it could be active, for example cutting pictures, pasting objects on cardboard, reciting, singing, dancing.
>
> Not involved. This was coded when the child showed no overt signs of being with the activity, yet was not misbehaving or behaving inappropriately. That is, not engaging in behaviors which could damage or prevent the lesson from going on.
>
> Inappropriately involved or deviant. Inappropriateness was coded when the child was involved in the activity but in a clearly unsuitable fashion, for example, pounding a magnet against the radiator instead of seeing what sticks to it. "Messing" with paste (even eating the paste) instead of pasting green and red squares on a cardboard, racing about when supposedly skipping to put a valentine in a mailbox. (Making "mistakes" or performing poorly were not coded as inappropriate.). A deviant act was an intentional wrongdoing on the part of the child: interference with an ongoing lesson (grabbing the book during teacher's reading of a story); aggression against children or property (hitting, putting paste in someone's hair, throwing equipment against the wall; interfering with legitimate work of other children (taking props away while another was working); open defiance of the teacher.

Each child was coded every 6 seconds from the time the lesson was started until it was over. Inter-coder agreement for three coders ranged from 93% to 96% agreement. These dependent variables became the percentage of behavior which occurred in each lesson. This score was computed by dividing the number of six-second units with appropriate involvement, no involvement, inappropriate behavior or deviancy by the total number of six-second units coded for that lesson.

Dependent Variable 2: Group Glee Code. Three categories of overt behaviors through which group glee manifested itself were laughter, screaming and intense physical acts. Laughter was limited to instances of vigorous and joyful laughter. Screaming was limited to ebullient vocalizations which were emitted either in an organized chantlike fashion or in random disarray. Intense physical actions were described as joyful physical behaviors such as hand clapping, jumping up and down, or other intense physical expressions. The three behaviors could have appeared simultaneously in various combinations, or by themselves. In all seven combinations were theoretically possible. However, intense physical actions without laughter or screaming were found to be quite difficult to perceive as joyful and so were excluded from the coding. This left six possible combinations of behavioral manifestations. In the coding of the formal lesson video tapes, if one of the behavioral manifestations or combinations was recognized, a ratio of the number of children involved in a gleeful incident to the number of children present at its occurrence was calculated. If this ratio was 50% or more, an incident of group glee was noted. This ratio was used only in the formal lesson settings. In the freeplay environment 37 children were videotaped through their entire nursery school day. Any behavioral manifestations of glee were coded, as well as the numbers of children present and participating in the event, however, the 50% or more restriction was not used. Inter-rater reliability for this code was 92% agreement. Both frequency and duration data were recorded. When an incident of group glee was recognized, it was timed from the first overt signs until it ceased. Later a ratio of group glee rate per hour was computed. This "glee rate" was used as one of the dependent variables in later analyses.

Independent Variables. These codes are of major interest with regard to a Gibsonian "affordance" perspective. The categorization of the formal lessons was the major challenge. The ecological niches that lessons represent offer numerous dimensions which might be meaningfully related to behavioral involvement. The strategy was to first identify lesson types rather than single variables. While inferences about operative variables within lesson types were made, the initial effort was to discriminate lessons as wholes rather than to measure specific unidimensional variables within lessons. Eventually six categories of lessons were determined.

As one observes children in a lesson, it becomes clear that their actions are prodded, oriented, and supported by the external provisions of the lesson. These provisions include the communications of the teacher as well as the influence of the props which are used in these lessons. A lesson also includes the standing behavior pattern that goes with the lesson. Those external provisions which signal these standard actions can be labelled signal systems. One of the principal ways in which lessons differ is in the pattern of their signal systems. Lesson signal systems are like the participation rules of a game: they are repetitive. One can assume that when lesson type X appears a second time, a signal system X1 will also reappear; that is, the external provisions supportive of standard participant action which appeared in the first instance will reoccur in the second.

Two conceptual dimensions related to signal systems include continuous/laging and intrusive/insulated signal systems. We hypothesized that the more continuous and unlaging the provisions of a lesson, the greater the task involvement of a group of children. We assumed that all lessons are planned to produce such continuity and related task involvement. The problem becomes one of seeing whether certain types of lesson formats are more likely to produce a continuous flow of appropriate signals than are others. A reciprocal problem is to ascertain whether certain structures increase the likelihood of lags that may reduce task involvement and make the lesson more vulnerable to inappropriate or deviant behavior.

A second concept is that of intrusiveness and insulation. Signal systems may be more or less intrusive. They may contain props (drums, bells) or constituent actions (dancing, jumping, singing) which produce intense stimuli. These stimuli are likely to intrude into participants' attention; that is children begin to key off one another as well as off the central signal. Such lessons contain high intrusiveness. Highly intrusive signal systems are hypothesized to have high inappropriate and deviant behaviors associated with them. The opposite of intrusiveness is insulation. A signal source might rest on the results of each child's own actions on his own props, producing a tight, closed behavior-environment circuit. This closed circuit insulates the lesson and shields each child from foreign inputs (distractions, other children's deviancies) which may serve as stimuli to inappropriate behavior. An example of a highly insulated signal system might be an arts/crafts lesson where each child has his own paints, brushes and paper upon which to make a picture. The teacher provides each child with the necessary props. After a child begins such an activity, the major and persisting external signals come from the changing conditions of his materials: a picture slowly materializes on his paper. One line or color leads to another until the picture is completed. Such a format, in addition to continuity, contains a high degree of insulation. This lesson type should produce relatively low inappropriate and deviant behaviors.

With these concepts in mind, a signal system code was developed employing the ideas of continuous vs laging and intrusiveness vs insulation. All 596 lessons were categorized as belonging to one of six mutually exclusive lesson types. Inter-rater reliability on the lesson code obtained 90% agreement. The following six lesson types then constituted the independent variables for the study:

1. Signals from effects of own behavior on continuously present materials (making individual constructions). Highly insulated closed circuit. High continuity.

2. Sequenced signals from a single, continuously emitting source (listening to teacher or records). High continuity. Low intrusiveness.

3. Teacher paces signals to children; also uses continuous external signal source (exploring, reacting to demonstrations.) Moderate intrusiveness. Moderate continuity.

4. Recitation: with discrete, multiple child signals (dealing with concepts, categories, numbers). Low continuity. Moderate intrusiveness.

5. Multiple and shifting signals primarily from child sources (role playing, general talking, group construction). Low continuity. High intrusiveness.

6. Signals from central source and inputs from high intensity props or actions (singing, moving body). High intrusiveness. Moderate continuity.

Analyses.

Since no control was used over which teachers taught which lesson types (an unobtrusive and naturalistic approach), the data were unbalanced with regard to the number and type of lessons. The teachers utilized a representative range of lesson types: 33 of the 36 teachers taught five of the six lesson types. The problem of analysis was a comparison among the six lesson formats of children's mean off-task behaviors. A series of correlated t-tests was used to contrast lesson types taught by the same teachers. For example, all teachers and groups who operated in at least one individual-construction lesson (Lesson Type 1) and in at least one teacher (or record) story lesson (Lesson Type 2) were compared. If teachers taught several lessons in any one lesson type, their score was the mean off-task score for that lesson type. Since not all teachers taught all six types of lessons, the n's and the means varied slightly for each comparison. Conservative two-tail probability tests were utilized. In the comparisons among the six different lesson types of mean glee rate per hour, Wilcoxon matched-pairs signed-rank tests were used.

RESULTS

Summary of findings. Orthogonal contrast among the six lesson types of mean off-task behaviors for the 36 teachers are displayed in Table 1. The means in the column labelled M are for all teachers who taught those lessons. The means in Columns 2 through 6 represent means for teachers who taught both of the compared lesson types. Lesson types can be grouped into three levels based on the proportionate amount of appropriate task involvement. Lesson Type 1 produced significantly less off-task behavior than all other types. Such individual construction lessons contained continuous signals from the results of each child's own action as well as a postulated insulation from external intrusions. Lessons with moderate success are the Type 2 and Type 3 formats. Both are inferior to the individual construction format, superior to the Type 4, 5, and 6 lessons, and not different from one another. Both Type 2 and Type 3 possess a postulated high degree of continuity and freedom from lags: this is true of books and records because of pre-programmed and sequenced signals from a

continually emitting source and it is true of teacher-directed demonstrations because of clear sequencing and continually present central props on which there is a continuous focus. It would be reasonable to combine lesson Types 2 and 3 into one type. When this is done, the combined type is less successful than Type 1 ($p<.001$) and more successful than Type 4 ($p<.023$, Type 5 ($p<.005$), and Type 6 ($p<.001$). The least successful lessons are Types 4, 5, and 6. These produce significantly more non-task behavior than all the others and are not significantly different from one another. Recitations, role play, and group construction have many lags due to the absence of continuous sequencing and/or to their dependence upon potentially faltering inputs from other children. Even though Type 6 lessons, movement and music, possess a single, continuously emitting source, they are vulnerable to inappropriate behavior because the intense props or behaviors in this format are potentially intrusive.

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PUT TABLE 1 HERE
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Kounin & Gump (1974) concluded that their model suggested that the pattern and quality of the signal system is a crucial consideration in predicting child involvement in prescribed lessons in preschools. Three dimensions related to signal input which were suggested by this research were (a) continuity of signal input, (b) insulation of participants from potential distracting stimuli, and (c) intrusiveness of respondent action.

Table 2 presents the orthogonal contrast among the six lesson types of children's mean rate per hour of group glee. The prevalence of group glee in the various lesson types was thought to be a measure as of the insulatory as well as intrusive quality of a lesson type. Closed-circuit systems (lesson Type 1), were believed to be relatively more insulated from inputs from other children. Thus, if glee as a form of humor is a socially interdependent and provoked behavior, it would be less prevalent in lessons of the Type 1 variety. Likewise, lesson Types 6, which is much more prone to intrusions by intense props and child actions, was expected to contain the most gleeful behaviors. The rate of glee in Type 1 lessons, individual-construction, was significantly ($p<.005$) lower than in all other lesson types, supporting the theory of its high insulatory properties. The rate of glee in lesson Type 6, the music-movement format, was significantly ($p<.005$) higher than in all other lessons, supporting the theory of its relatively high intrusiveness or low insulatory properties.

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PUT TABLE 2 HERE
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In addition to the analysis of glee rate among the six lesson types, the glee rates of 37 children in the freeplay environment were contrasted with the same children's glee rates obtained in the lesson formats. These analyses were reported in Sherman (1977) and obtained a statistically significant and greater rates of glee in the lesson formats than in the freeplay environment ($p<.001$).

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While the majority of children behave appropriately most of the time in teacher directed mini-lessons, when there is off-task behavior it is more likely to occur in some environmental structures (lesson types) than in others. In other words, children's behavioral actions are, for the most part, synomorphous with the behavior settings they find themselves in. Even though we found variability in the amount of off-task behaviors of children within teachers teaching the same lesson types - some teachers had more off-task behaviors than others, the primary statistically significant differences obtained in these analyses suggest that it is the lesson type, rather than the quality of the teacher's behaviors, which predict task appropriate behaviors. There may indeed be some regularity (invariance) in children's behaviors which may be attributed to environmental conditions. This would appear to be true of children's behaviors which are associated with certain tasks, as well as their gleeful and humorous behaviors.

DISCUSSION

Ecological psychology has maintained that to truly understand human behavior, we must understand the interdependencies between organisms and their environments. This would be true of traditionally Lewinian oriented or Gibsonian psychological ecologists. In the beginning of this essay, it is suggested that Gibson was probably ignorant of the research activities of Lewin's student, Jacob S. Kounin. While Gibson might have been aware of Roger Barker's activities, he makes no citations to Barker's work. Thus, this author would conclude that Gibson did not see relevant connections between these Lewinian-oriented researchers, if he even knew of their work? Kounin made no mention of James Gibson's work, and this author believes that Kounin actually did not know of Gibson's research activities. As explained earlier, this state of affairs is not unusual. After all Gibson is much more known for his work in "perception" and Kounin for his work in "classroom management".

Nevertheless, it is believed that both of these men might have benefited from each other's thoughts. Gibson's idea of an Affordance, as described in the beginning of this paper, might be an excellent way of describing lesson types. Each of the six lesson types described above may afford more or less task apprcpriate behaviors, behaviors which are synomorphous with the activities which teachers try to direct. In other words, there may be some behavioral affordances associated with different lesson structures. Describing the lessons in signal system terminology (eg., using the ideas of continuity , insulation, and intrusiveness), may be a way of elaborating further dimensions of affordances. As Eleanor Gibson (1983) has quoted James Gibson as saying: "I need to find out what the environment offers in the way of affordances -- how to describe them, what the appropriate behaviors are -- and also whether and where they are perceived as affordances." (p. 57) One way of describing affordances may be through signal system terminology. Since children behave appropriately

and with some regularity within these systems, it would appear that they are perceiving the systems uniformly. This in itself might be evidence for the proposition that the lesson types are affordances.

Bronfenbrenner (1977; 1979) has described human ecology using four basic systems including the micro-, meso, exo- and macro-systems. All are presumed to be interdependent influences upon each other. The meso-system as described earlier is the different social contexts in which a child actively participates (eg., an immediate nursery school lesson). One might use Gibson's concept of affordance to describe a meso-system as well. However, this does not give us much more information than the term "meso-system." If we begin to describe a meso-system using signal system terminology, it becomes further differentiated. Our knowledge of children's actions within meso-systems becomes greatly expanded. Synomorphous behaviors of the same children, that is task appropriate behaviors, appear to be more likely in some lesson formats then in other formats. This might be interpreted as evidence for a social affordance; that is, the social interactions of the children are influenced by the behavior setting. This in itself might be an indication of not simply the children's social competence (ie., compliance to a learned set of rules), but rather a natural response to the social affordance of the lesson. Oppenheimer (1989) has cautioned that social competence may be merely a matter of social conformism. It may also be a natural response to what the environment affords. While the present studies described above can not rule out basic social incompetences of children as an explanation of off-task and deviant behaviors, it is believed that these behaviors may actually be more or less "natural" responses to certain behavior settings which are more prone, or likely to invite, off-task and deviant behaviors. The regularity with which certain lesson types (mainly Type 5 and 6) appear to "produce" off-task and deviant behaviors, might suggest that this is so.

When a lesson type that normally yields relatively high percentages of task-appropriate behaviors is found to be abnormally low in proper behaviors, what might be the cause? To answer this question Kounin & Doyle (1975) examined the continuity of signal systems in lessons of the same type. The results of their study showed that the degree of signal input continuity differentiated significantly between high task involvement and low task involvement of children within the same lesson type. When a normally preprogrammed and sequenced single signal system such as a Type 2 lesson (eg., teacher reading a book) had low task involvement rates, it tended to have many more lags and breakdowns in the signal quality. When signal output ceased creating a lag longer than 10 seconds, off-task and deviant behaviors were likely to ensue. Thus a lesson structure which might normally afford task-appropriate passive listening behaviors can yield relatively high rates of off-task and deviant actions when the signal system loses its continuous quality.

Stodolsky (1988) has acknowledged the importance of Kounin & Gump's (1974) signal system theory, and also added the importance of the quality of information within a segment of a signal. She stresses two important additional features: "...the complexity of the information, and the necessity of novelty of the information" (p. 16). In Stodolsky's (1988)

recent book, **The Subject Matters**, she presents evidence indicating that classroom activities are coherent actions shaped by the instructional context. One of her conclusions is that students respond to instruction very differently, depending on the structure and demands of the lesson. One might ask the question of how "development" is related to these findings. Kounin & Gump's study focused on a preschool sample from Detroit. Stodolsky's (1988) studies used samples of fifth grade children from the Chicago Public Schools. Stodolsky's conclusions about task involvement are quite similar to Kounin & Gump's (1974). Therefore, we might conclude that these structures have certain inherent properties (affordances) which "invite" task appropriate behaviors. Learning and development might influence children's ability to recognize and engage in proper social interactions in the classroom. However, children's behaviors may be more influenced by their interactions with specific environments.

Implications. The ecological structure invoked by a teacher to impart information in a classroom should be a basic pedagogical consideration in planning a lesson. Knowledge of behaviors afforded by particular behavior settings might influence teachers' choices of lesson structures as well as the preparations which they must make to effectively manage any particular lesson structure. Further research focused on learning more about the variety and effectiveness of lesson structures is needed. The knowledge which we already have needs to be related to preservice and inservice teachers. Educational psychology as a discipline needs to pay more attention to developments in the field of psychology in general. For example, it is surprising that few if any educational psychology text books pay any attention to the ideas associated with psychological ecology, James Gibson, Affordance Theory, or social affordances. When they do, it is usually in the context of classroom ecology, management and discipline, rather then a section concerned with the pedagogy of lesson planning and construction. Good & Brophy's (1986) Educational Psychology is a notable exception and good example of a text book which attempts to relate several dimensions of classroom psychological ecology, however, they fail to see the implications for teaching methodology, but rather focus on classroom management and discipline. A good example of a practical application of Kounin's signal system research is reported by Arlin (1979) who has trained preservice teachers in the management of activities, transitions, and time flow. While this later consideration is traditionally addressed in a "methods" class, it is in the educational psychology class were the theory and foundations of such issues should be presented.

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Table 1
Mean Off-Task Scores and Differences Between The Mean Scores Among Six Lesson Types.

Lesson Type	n	M	Lesson Types 2	3	4	5	6
1.	35	5.48	p<.01 n=32 M1=5.68 M2=9.94	p<.007 n=33 M1=5.50 M3=9.32	p<.001 n=34 M1=5.63 M4=12.63	p<.001 n=29 M1=5.46 M5=14.10	p<.001 n=33 M1=5.46 M6=12.89
2.	33	9.85		p<.65 n=31 M2=9.97 M3=9.07	p<.19 n=33 M2=9.85 M4=12.63	p<.04 n=27 M2=9.61 M5=15.15	p<.02 n=31 M2=9.47 M6=13.63
3.	34	9.25			p<.05 n=33 M3=9.03 M4=11.97	p<.01 n=29 M3=9.07 M5=14.50	p<.006 n=32 M3=9.12 M6=13.02
4.	35	12.29				p<.11 n=29 M4=11.27 M5=14.63	p<.59 n=33 M4=12.29 M6=13.24
5.	30	14.40					p<.32 n=28 M5=14.41 M6=12.72
6.	34	13.05					

Note. The means in the column labelled M are for all teachers who taught those lesson types; however, the means in Columns 2 through 6 represent means for teachers who taught both of the compared lesson types. All p levels are based on two-tailed significance tests.

Table 2
Mean Rates of Glee per Hour and Differences Between Mean Rates Among Six Lesson Types.

Lesson Type	n	M	Lesson Types 2	3	4	5	6
1.	35	1.20	p<.005 n=32 M1=0.70 M2=3.50	p<.025 n=33 M1=1.22 M3=3.39	p<.005 n=34 M1=1.18 M4=5.32	p<.005 n=29 M1=1.28 M5=5.74	p<.005 n=33 M1=1.22 M6=11.97
2.	33	3.38		p< ns n=31 M2=3.57 M3=3.56	p< ns n=33 M2=3.46 M4=5.57	p< ns n=27 M2=2.93 M5=6.18	p<.005 n=31 M2=3.42 M6=11.94
3.	34	3.29			p< ns n=33 M3=3.35 M4=5.38	p< ns n=29 M3=2.97 M5=5.29	p<.005 n=32 M3=3.20 M6=11.69
4.	35	5.21				p< ns n=29 M4=4.55 M5=6.31	p<.005 n=33 M4=5.21 M6=12.33
5.	34	5.99					p<.025 n=28 M5=6.42 M6=11.46
6.	34	11.89					

Note. The means in the column labeled M are for all teachers (n) who taught those lessons; however, the means in Columns 2 through 6 represent means for teachers who taught both of the compared lesson types. All p levels are based on Wilcoxon matched-pairs signed-ranks tests.

Table 3.
Mean Rate-per-hour of Gleeful Behaviors of 37 Children in Six Lesson Structures and the Freeplay Environment.

Environment	Mean rate-per-hour
Lesson Types	
1	1.35
2	2.65
3	7.61
4	4.64
5	7.41
6	17.98
pooled mean	6.49
Freeplay	1.97

Note. Statistically significant ($p<.001$) differences were obtained among the six lesson types, $F(5,165)=9.73$. A statistically significant difference ($p<.001$) between the pooled mean for the lessons and the Freeplay environment was also noted, $F(1,33)=23.59$.

25

LEWINIAN LIFE SPACE

$BH = f(P+E)$

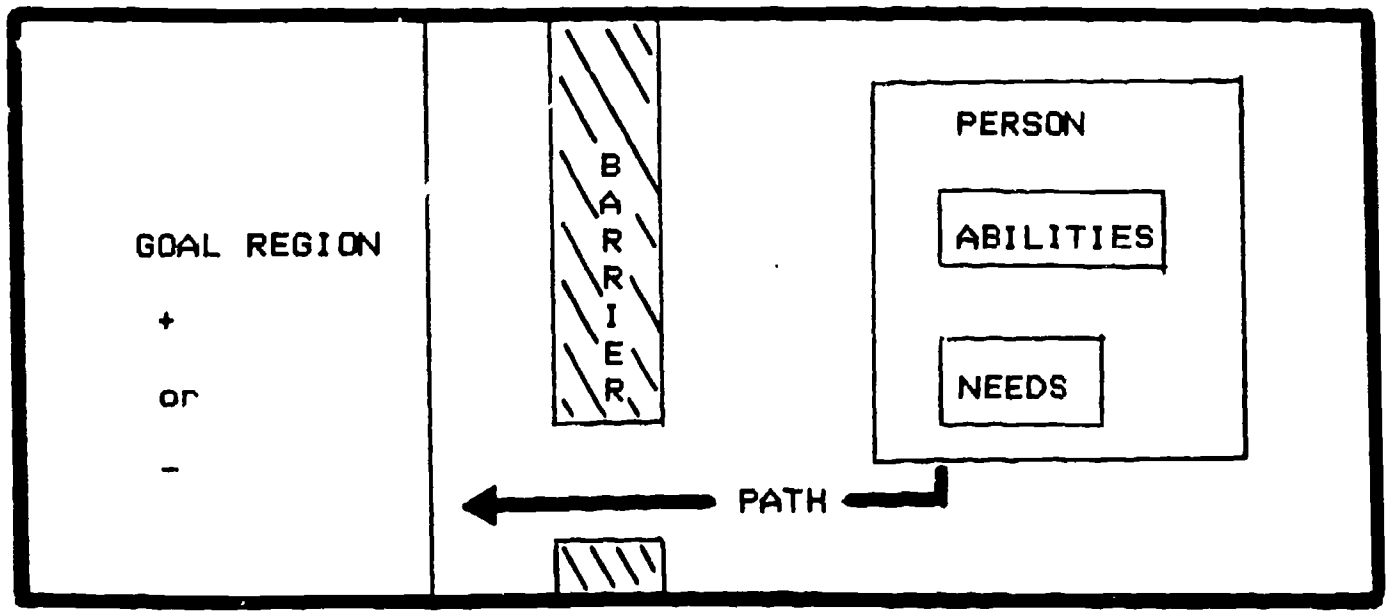

FIGURE 1.

THE GENERATIONS OF LEWINIAN INFLUENCE

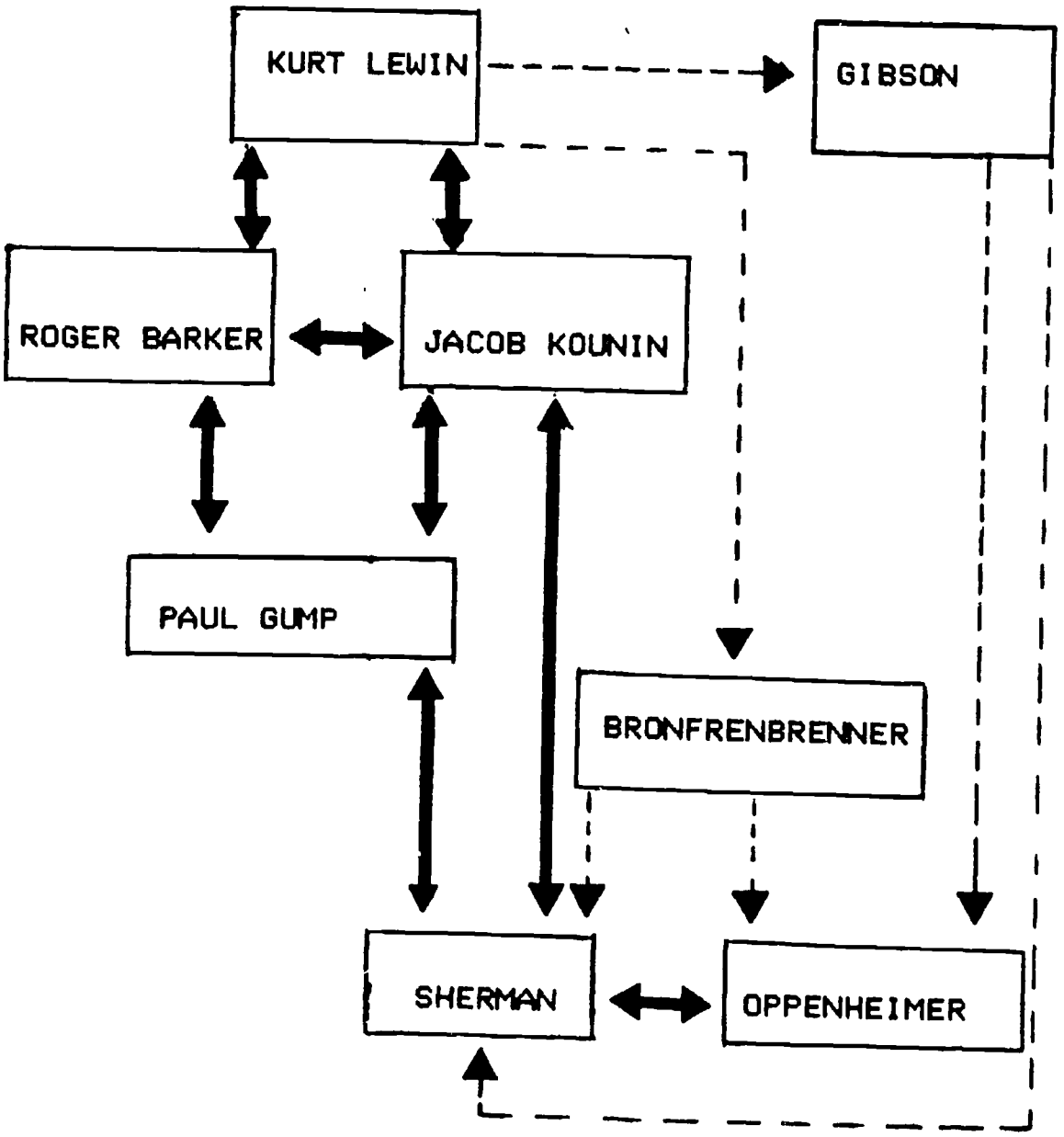

FIGURE 2

- - - - = INDIRECT LINE OF INFLUENCE

_____ = DIRECT LINE OF INFLUENCE